# *REMARKS*

Applicants thank the Examiner for the very thorough consideration given the present application.

Claims 1-18 are now present in this application. Claims 1 and 12 are independent.

Amendments have been made to the specification, and claims 1, 2, 7, 12, 13 and 14 have been amended. Reconsideration of this application, as amended, is respectfully requested.

## *Priority Under 35 U.S.C. § 119*

Applicants thank the Examiner for acknowledging Applicants' claim for foreign priority under 35 U.S.C. § 119, and receipt of the certified priority document.

## *Objection to the Drawings*

The Examiner has objected to the drawings because the assigned numbers in all figures do not clearly point to the assigned features or parts.

In order to overcome this objection, Applicants are concurrently submitting Proposed Drawing Corrections for the Examiner's approval, which

address each of the deficiencies pointed out by the Examiner. Accordingly, reconsideration and withdrawal of this objection are respectfully requested.

*Specification Amendments*

Applicants have amended the specification in order to correct minor typographical errors, and to place the specification in better form.

*Rejection Under 35 U.S.C. § 112, 2nd Paragraph*

Claims 1-11 stand rejected under 35 U.S.C. § 112, 2nd Paragraph. This rejection is respectfully traversed.

The Examiner states that in claim 1, with the color filter formed over the pixel electrode (feature d), how a first orientation film should be formed on the black matrix and the pixel electrode (feature f). Claims 2-10 are rejected since they depend on the indefinite claim. Applicants have amended the claims as needed to address the Examiner's concerns.

Claims 12-18 stand rejected under 35 U.S.C. § 112, 2nd Paragraph as being indefinite. This rejection is respectfully traversed.

The Examiner states that in claim 12, the omitted steps are: "sealing the substrate" for holding an injected liquid crystal inside the gap between

substrates. The Examiner rejected claims 13-18 because they depend on the indefinite claim.

Claims 1-18 stand rejected under 35 U.S.C. § 112, 2nd Paragraph as being indefinite. This rejection is respectfully traversed.

The Examiner asserts that the term "upper" or "lower" in claims 1 and 12 is a relative term which renders the claims indefinite.

In order to overcome this rejection, Applicants have amended claims 1 and 12 as necessary to correct each of the deficiencies specifically pointed out by the Examiner. Applicants respectfully submit that the claims, as amended, particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

*Rejection Under 35 U.S.C. § 102*

Claims 1, 2 and 12 stand rejected under 35 U.S.C. § 102(b) as being anticipated by the Related Art (disclosed art is not Prior Art). This rejection is respectfully traversed.

Applicants have amended independent claims 1 and 12 to distinguish between first and second substrates in accordance with the Examiner's comments. The related art discloses a substrate forming an uppermost layer of a display panel. However, the uppermost layer does not have a switching element

disposed thereon, thus requiring the use of a second black matrix. Therefore the related art fails to disclose a first substrate forming an uppermost layer of said display panel, including: a switching element on the first substrate, as recited in independent claim 1, and similarly recited in independent claim 12.

With regard to dependent claims 2-11 and 13-18, Applicants submit that claims 2-11 and 13-18 depend, either directly or indirectly, from independent claims 1 and 12 which is allowable for the reasons set forth above, and therefore claims 2-11 and 13-18 are allowable based on their dependence from claims 1 and 12. Reconsideration and allowance thereof are respectfully requested.

*Allowable Subject Matter*

The Examiner has failed to reject claims 3-11 and 13-18 based on any art grounds. Applicants believe that these claims contain allowable subject matter since the claims from which they depend have been amended to overcome the rejection under 35 U.S.C. § 112, 2nd Paragraph. Applicants request that the Examiner indicate the allowable subject matter in these claims in the next Office Action.

*Conclusion*

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone Percy L. Square, Registration No. 51,084, at (703) 205-8034, in the Washington, D.C. area.

Prompt and favorable consideration of this Amendment is respectfully requested.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made

## VERSION WITH MARKINGS TO SHOW CHANGES MADE

*In the Abstract*:

The Abstract has been amended as follows:

--**ABSTRACT OF THE DISCLOSURE**

The present invention discloses a liquid crystal display device, comprising: [an] a first upper substrate including: a) a switching element on the first upper substrate; b) a passivation film formed over the whole surface of the first upper substrate while covering the switching element; c) a pixel electrode on the passivation film; d) a black matrix formed on the passivation film and over the switching element; e)a color filter formed over the pixel electrode; and f) a first orientation film formed on the black matrix and the color filter and above the pixel electrode; a lower second substrate having a common electrode and a second orientation film, the orientation film formed on the common electrode; sealing the first and second substrates with a sealant and a liquid crystal layer interposed between the first upper and second lower substrates.--

*In the Specification*:

The paragraph beginning on page 1, line 11, has been amended as follows:

--Recently, a liquid crystal display device adopts a structure [that] wherein a color filter and a black matrix are formed over a thin film transistor array substrate to obtain a [for the sake of the] higher aperture ratio. The liquid crystal display device having such a structure (hereinafter, referred to simply as "the C/F and BM on array structure") includes a top substrate, [the] a bottom substrate, and a liquid crystal layer interposed between the two opposite substrates. The bottom substrate has an array of [the] thin film transistors

formed over the top surface of the bottom substrate, and both [the] a black matrix and [the] a color filter are formed over the thin film transistor array.--

The paragraph beginning on page 1, line 24, has been amended as follows:

-- As described above, the liquid crystal display device having the C/F and BM on array structure has the advantage of a high aperture ratio. However, most of the liquid crystal display devices having the C/F and BM on array structure have an additional black matrix formed over the bottom surface of the top substrate in order to prevent a diffused reflection, or a reflection or [a] dispersion of light.--

The paragraph beginning on page 2, line 10, has been amended as follows:

--Each of the thin film [transistor] transistors 20 has a gate , a source, and a drain [electrodes] electrode. The gate electrode, the source electrode and the drain electrode are electrically connected with the gate line 32, the data line 36, and the pixel electrode, respectively.--

The paragraph beginning on page 2, line 13, has been amended as follows:

--Fig. 2 is a cross sectional view showing the typical transmissive liquid crystal display device having the C/F and BM on array structure. Referring to [the] Fig. 2, in the conventional liquid crystal display device, a second substrate 50 [as an upper substrate] is aligned with the first substrate 10 [as [the] a lower substrate], a liquid crystal layer 60 is interposed between the two opposite substrates 10 and 50, and a back light device 80 is positioned under the first substrate 10.--

The paragraph beginning on page 2, line 19, has been amended as follows:

--On the first substrate 10, [the] a gate electrode 22 of the thin film transistor 20 is formed, and a gate insulating layer 42 is formed on the exposed surface of the substrate 10 while covering the gate electrode 22.--

The paragraph beginning on page 3, line 1, has been amended as follows:

--Further, the source and the drain electrodes 28a and 29b [spaced apart from each other] are formed covering the ohmic contact layer 26 over the semiconductor island 24, and a passivation film 48 is formed covering the thin film transistors 20, and has a contact hole [100] 30 on a predetermined portion of the drain electrode 28b. The pixel electrode 102 is formed on the passivation film 48 and is electrically connected with the corresponding drain electrode 28b through the corresponding contact hole 30. A first black matrix 46 is formed on a portion of the passivation film 48 over the TFT.--

The paragraph beginning on page 3, line 8, has been amended as follows:

--[The color] Color filter 104 of red (R), green (G) and blue (B) are formed on the corresponding pixel electrode 102, respectively. Fig. 2 shows only the color filter layers [of] G and R.--

The paragraph beginning on page 3, line 11, has been amended as follows:

--On the color filter 104 and the black matrix 46, a first orientation film 44 is formed and faced with [the] liquid crystal layer [6] 60.--

The paragraph beginning on page 4, line 8, has been amended as follows:

--Though the width of the second black matrix 56 is narrower than that of the first black matrix 46, since both the first and the second substrates have the first and second black matrices, respectively, the substrate-aligning process [becomes] is [more difficult]complicated, leading to [increasing an] increase in

alignment error. That is to say, the addition of the second black matrix results in an addition of an inferiority factor to the substrate-aligning process.--

The paragraph beginning on page 4, line 14, has been amended as follows:

--Further, the number of processes [of] for forming the second black matrix 56 at the second substrate is [added] increased due to the addition of the additional black matrices 56.--

The paragraph beginning on page 4, line 16, has been amended as follows:

--For the foregoing reason, there is a need for a liquid crystal display device that is free from [an affection] the effect of the dispersion reflection, and has a high aperture ratio and [has] a simplified substrate-aligning process.--

The paragraph beginning on page 5, line 1, has been amended as follows:

--an upper substrate including: a) a switching element on the upper substrate; b) a passivation film formed over the whole surface of the upper substrate while covering the switching element; c) a pixel electrode on the passivation film; d) a black matrix formed over the switching element; e) a color filter formed over the pixel electrode; and f) a first orientation film formed on the black matrix and the pixel electrode; a lower substrate having a common electrode and a second orientation film, the orientation film formed on the common electrode; and a liquid crystal layer interposed between the upper and lower substrates.--

The paragraph beginning on page 5, line 19, has been amended as follows:

--Fig. 3 is a simplified cross-sectional view illustrating a configuration of the liquid crystal display device according to [the] a preferred embodiment of the present invention;--

The paragraph beginning on page 6, line 1, has been amended as follows:

--Fig. 5 is a partial cross-sectional view illustrating a modification of the liquid crystal display device according to [the] a preferred embodiment of the present invention; and--

The paragraph beginning on page 6, line 4, has been amended as follows:

--Fig. 6 is a partial cross-sectional view illustrating another modification of the liquid crystal display device according to [the] a preferred embodiment of the present invention.--

The paragraph beginning on page 6, line 7, has been amended as follows:

--Fig. 7 is a simplified cross-sectional view illustrating a configuration of the liquid crystal display device according to [the] a preferred embodiment of the present invention;--

The paragraph beginning on page 6, line 12, has been amended as follows:

--Fig. 9 is a partial cross-sectional view illustrating a modification of the liquid crystal display device according to [the] another preferred embodiment of the present invention; and--

The paragraph beginning on page 6, line 15, has been amended as follows:

--Fig. 10 is a partial cross-sectional view illustrating another modification of the liquid crystal display device according to [the] another preferred embodiment of the present invention.--

The paragraph beginning on page 6, line 20, has been amended as follows:

--Reference will now be made in detail to [the] a preferred embodiment of the present invention, [example] examples of which [is] are illustrated in the accompanying drawings.--

The paragraph beginning on page 7, line 7, has been amended as follows:

--As the upper substrate, the first substrate 10 has pixel electrodes, thin film transistors as a switching element, color [filter] filters, and a black [matrices] matrix disposed between boundaries of the color filters. As the lower substrate, the second substrate 50 has a common electrode.--

The paragraph beginning on page 7, line 11, has been amended as follows:

--Fig. 4 is a cross sectional view illustrating the transmissive liquid crystal display device according to the preferred embodiment of the present invention. As shown in [the] Fig. 4, an upper substrate 10 has a thin film transistor, a black matrix 46, a pixel electrode 102 and a color filter 104. The upper substrate 10 is the one in which the thin film transistor array substrate is turned upside down. The thin film transistor 20 has a gate electrode 22, a semiconductor layer 24, an ohmic contact layer 26, a source electrode 28a and a drain electrode 28b. To manufacture the upper substrate 10, first the gate electrode 22 is formed on the upper substrate 10, and then a gate insulating layer 42 is formed on the exposed bottom surface of the upper substrate 10 while covering the gate electrode 22.

The gate electrode 22 extends from the gate line (not shown) and made of Al or Cr, and the gate insulating layer is made of an inorganic or organic material. The semiconductor layer 24 in the form of an island is formed over the gate electrode 22, and the ohmic contact layer 26 is formed on the semiconductor layer 24 by ion-doping. The source and drain electrodes 28a and 28b are formed to overlap the ohmic contact layer 26, respectively. The source and drain electrode 28a and 28b are made of Al or Cr. The source electrode 28a extends from the data line (not shown). Then, a passivation film 48 is formed over the whole surface of the upper substrate 10 while covering the source and drain electrodes 28a and 28b. The passivation film 48 is made of an inorganic or organic material. The passivation film 48 has a contact hole 30 on a predetermined portion of the drain electrode 28b. The pixel electrode 102 is formed on the passivation film 28 and is electrically connected with the drain electrode [228b] 28b through the contact hole 30. The pixel electrode 102 is made of indium tin oxide (ITO). The black matrix 46 is formed over the TFT and the gate and data lines, and the color filter 104 is formed over the pixel electrode 102. Finally, a first orientation film 44 is formed covering the black matrix 46 and color filter 104. After manufacturing, the thin film transistor array substrate 10 is turned upside down to align with the lower substrate 50.--

The paragraph beginning on page 8, line14, has been amended as follows:

--The black matrix 46 prevent light of the back light device 80 from passing through the gaps between the gate line and the pixel electrode and the data line and the pixel electrodes. Also, the black matrix 46 shields the thin film transistors from incident light and prevents the mixing of dispersed portions of light passing through the respective color filter layers. The mixing of the light passing through the respective color filters results in [a] degradation of a contrast ratio or variation of the colors. To maximize an aperture ratio, the

pixel electrodes may overlap the gate and data lines so that the black matrix is formed only over the thin film transistor. Since the gaps are excluded, the black matrices have a smaller size, serving only to shield the thin film transistors from the light of the back light device 80, and thus the aperture ratio becomes maximized. In that case, the gate and data lines prevent the above-mentioned light leakage and the mixing of the disposed portion of light passing through the respective color filter layers.--

The paragraph beginning on page 10, line 1, has been amended as follows:

--Fig. 5 shows a modification of the liquid crystal display device according to [the] a preferred embodiment of the present invention.--

The paragraph beginning on page 10, line 3, has been amended as follows:

--As shown in Fig. 5, in order to prevent a reflection of incident light from the gate electrode, the source electrode, the drain electrode, and the gate and data lines, a gate light absorbing film 34, a source light absorbing film 38a, and a drain light absorbing film 38b are formed under the gate electrode 22, the source electrode 28a, and the drain electrode 28b, respectively. Further, the source light absorbing film 38a shields the data line (not shown) from incident light, and the gate light absorbing film 34 shields the gate line (not shown) from incident light. The light absorbing films 34, 38a and 38b are made of a low reflectance material such as an oxidation film, or a nitride film, and a black resin.--

The paragraph beginning on page 10, line 12, has been amended as follows:

--In other words, after a first light absorbing film for the gate light-absorbing pattern 24 is deposited on the first substrate 10, a first metal layer for the gate electrodes 18 and the gate lines such as aluminum or chromium is deposited on the light absorbing film. Then, the light absorbing film and the first metal layer are patterned at [one] the same time so as to form the gate light-absorbing layer 34, the gate electrodes 22 and the gate lines (not shown).--

The paragraph beginning on page 10, line 18, has been amended as follows:

--Further, before a second metal layer for the source and the drain electrodes 28a and 28b and the data lines are deposited, a second light absorbing film is deposited over an gate insulating layer 42 so as to cover an ohmic contact layer 26. Then, the second metal layer is deposited on the second light absorbing film, and the second metal layer and the second light absorbing film are patterned at [one] the same time so as to form the source and drain light-absorbing films 38a and 38b, the data lines, and the source and the drain electrodes 28a and 28b.--

The paragraph beginning on page 11, line 13, with the following rewritten paragraph:

--Herein[ ]before, the preferred embodiment of the present invention is explained centering on the transmissive liquid crystal display device, but the preferred embodiment of the present invention can be also directed to the reflective liquid crystal display device. Figs. 7 to 10 shows the reflective liquid crystal display device according to the preferred embodiment of the present invention. The reflective liquid crystal display device according to [the] this preferred embodiment of the present invention has the same configuration as

the transmissive liquid crystal display device, except that the back light device 80 is not [arranged] present, and the common electrode 52 is made of an opaque conductive material. Therefore, the detailed explanation for the reflective liquid crystal display device according to the preferred embodiment of the present invention is omitted for the sake of the simplicity.--

The paragraph beginning on page 11, line 24, has been amended as follows:

--As described herein before, according to the preferred embodiment invention, the liquid crystal display device can have a high aperture ratio, a high display quality and a high contrast ratio. Further, the liquid crystal display device can be manufactured by [the] a simplified process. Besides, the dazzling of the screen due to the reflection of incident light can be prevented.--

## *In the Claims*:

The claims have been amended as follows:

1. (Amended) A liquid crystal display device, comprising:

a display panel;

a[n upper] first substrate forming an uppermost layer of said display panel, including:

g) a switching element on the [upper] first substrate

h) a passivation film formed over the whole surface of the [upper] first substrate while covering the switching element;

i) a pixel electrode on the passivation film;

j) a black matrix formed on the passivation film and over the switching element;

k) a color filter formed over the pixel electrode; and

l) a first orientation film formed on the black matrix and the color filter and above the pixel electrode;

a [lower] second substrate aligned with the first substrate and formed adjacent to a backlight device, to prevent the degradation of contrast resulting from the mixing of dispersed light, having a common electrode and a second orientation film, the orientation film formed on the common electrode; [and]

sealing the first and second substrates with a sealant; and

a liquid crystal layer interposed between the first [upper] and second [lower] substrates.

2. (Amended) The liquid crystal display device of claim 1, wherein the switching element is a thin film transistor, the thin film transistor having a gate electrode formed on the [upper] first substrate, a gate insulating layer formed on the exposed surface of the [upper] first substrate while covering the gate electrode, a semiconductor layer formed over the gate electrode, a source electrode overlapping one end portion of the semiconductor layer, and a drain electrode overlapping the other end portion of the semiconductor layer.

7. (Amended) The liquid crystal display device of claim 5, [further comprising, a] wherein the back light device is for supplying light to the liquid crystal layer.

12. (Amended) A method of manufacturing a liquid crystal display device which comprises an array of thin film transistors and an array of pixel electrodes including:

forming a gate line and a gate electrode on [an] a first [upper] substrate said first substrate forming the uppermost layer of a display panel, the gate electrode extending from the gate line [electrode];

forming a gate insulating layer on the exposed surface of the upper substrate while covering the gate line and the gate electrode;

forming a semiconductor layer over the gate electrode;

forming a data line and source and drain electrodes, the source electrode overlapping one end portion of the semiconductor layer, the drain electrode overlapping the other end portion of the semiconductor layer, the source and drain electrodes spaced apart from each other, the source electrode extending from the data line;

forming a passivation film over the whole surface of the [upper] first substrate while covering the source and drain electrodes, the passivation film having a contact hole on the drain electrode;

forming a pixel electrode on the passivation film, the pixel electrode electrically connected with the drain electrode through the contact hole;

forming a color filter on the pixel electrode;

forming a black matrix over the thin film transistor;

forming a first orientation film on the color filters and the black matrices;

forming a common electrode on a [lower] second substrate;

forming a second orientation film on the common electrode;

aligning the [upper] first substrate turned upside down with the [lower] second substrate so that the first orientation film of the first substrate is opposite to the second orientation film of the second substrate with a gap there between to prevent degradation of the contact resulting from the mixing of dispersed light; [and]

sealing the first and second substrates with a sealant; and

injecting a liquid crystal between the [upper] first substrate and the [lower] second substrate.

13. (Amended) The method of claim 12, further comprising:

forming a first light absorbing film between the [upper] first substrate and the gate electrode; and

forming a second light absorbing film between the semiconductor layer and the source and drain electrodes.

14. (Amended) The method of claim 12, further comprising:

forming a first light absorbing film between the [upper] first substrate and the gate electrode; and

forming a second light absorbing film between the semiconductor layer and the gate insulating layer.